

# EMx Catalytic Absorption System

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## Summary

EmeraChem has developed a highly effective, multi-pollutant reduction process to reduce nitrogen oxides (NO<sub>x</sub>), carbon monoxide (CO), and volatile organic compounds (VOCs) in the form of unburned hydrocarbons (UHCs) from natural gas-fired systems to ultra low levels. This innovative system also has demonstrated the reduction of Particulate Matter (PM) between 30 & 60% and the removal of gaseous sulfur compounds by over 90%.

EmeraChem's process for control of NO<sub>x</sub>, CO, VOC, SO<sub>x</sub> and PM emissions from natural gas fired combustion processes such as turbines, boilers, lean-burn engines, natural gas process heaters, and a variety of utility and industrial applications has demonstrated the capability to reduce emissions below detectable levels and does not require injection of ammonia or other chemicals. This process technology is called EMx.

The EMx system is a breakthrough pollution control technology that utilizes a single catalyst for the reduction of NO<sub>x</sub>, CO and VOCs. The system does not utilize ammonia or other hazardous materials, and can operate effectively at temperatures ranging from 300°F to greater than 700°F, making it well suited for both new and retrofit applications. The system does not produce any toxic by-products and does not require the delivery of additional chemicals to the site for its operation. Since the inputs that are utilized in EMx™ operation (natural gas, water, steam, electricity, and ambient air) are present at most power plants, the logistics of plant operation do not change when the system is installed.

EMx™ offers many advantages when compared to other process technologies. EMx™ eliminates operational and community concerns caused by competing technologies which utilize ammonia and create additional by-products. Due to the combination of highly effective reduction of NO<sub>x</sub>, destruction of CO & VOCs, and the absence of ammonia, the system successfully prevents a net increase of PM-10 formation. EMx™ also has the capability to achieve further multi-pollutant reductions by simply adding more catalyst as more stringent emission reductions are promulgated.

The U.S. EPA proclaimed the EMx™ technology as "Best Available Control Technology" (BACT) and "Lowest Achievable Emission Rate" (LAER) for natural gas fired turbine applications in 1997 and 1998 respectively. As of May 2000, EMx™ was proclaimed as the Maximum Achievable Control Technology (MACT) for formaldehyde, acetaldehyde, and benzene with the U.S. EPA. Currently, the EMx™ systems installed have demonstrated emission levels below 1 ppm NO<sub>x</sub> and CO (virtually undetectable).

Since the original commercial EMx™ installation in 1997, EmeraChem has been monitoring EMx's effect on Particulate Matter (PM). The collected data has demonstrated the ability of EMx™ to prevent PM formation from natural gas-fired turbine exhausts. This is possible since EMx™ does not use ammonia, a known precursor to particulate formation in the form of ammonium sulfate and ammonium nitrate or ammonia slip.